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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,120	04/23/2002	Jakob Nielsen	66722-012-7	3828

25269 7590 05/18/2006

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EXAMINER	
KURR, JASON RICHARD	
ART UNIT	**PAPER NUMBER**
2615	

DATE MAILED: 05/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 10/031,120	Applicant(s) NIELSEN ET AL.	
	Examiner Jason R. Kurr	**Art Unit** 2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 February 2006.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-9 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

¶ *5.03 Reassignment Affecting Application Location*

The Art Unit location of your application in the USPTO has changed. To aid in correlating any papers for this application, all further correspondence regarding this application should be directed to Art Unit **[2615]**.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 4-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Engebretson (US 5,475,759) in view of Hansen (US 5,680,467) and in further view of Gao et al (US 6,876,751 B1).

With respect to claim 1, Engebretson discloses a method for canceling feedback in an acoustic system comprising a microphone (fig.4 #101), a signal path (fig.4 #105), a speaker (fig.3 #17), and filter means (fig.4 #113) for compensating at least partly a possible feedback signal (col.8 ln.24-28), the method comprising: using a LMS algorithm for generating filter coefficients (col.9 ln.14-24); using an additional feedback cancellation filter (fig.4 #109) and a noise generator (fig.4 #115) for providing low-frequency input for the LMS algorithm (col.8 ln.38-52, col.10 ln.10-17).

Engebretson does not disclose expressly means for detecting presence of feedback between the speaker and the microphone.

Hansen discloses means for detecting presence of feedback between the speaker and the microphone (fig.2 #31).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the feedback detection means of Hansen in the invention of Engebretson.

The motivation for doing so would have been to detect changes in the feedback path thus allowing the hearing aid to compensate for these changes by adjusting the speed at which the feedback cancellation filter's coefficients are updated. This would allow the hearing aid to adjust precisely according to environmental changes without inconveniencing the user of the hearing aid as taught by Hansen (col.1 ln.43-55).

Engebretson does not disclose expressly using a highpass filter to prevent low-frequency signals from entering the LMS algorithm.

Gao discloses a method of adaptively canceling acoustic feedback wherein a highpass filter (fig.6 "BPF1") prevents low frequency signals from entering an LMS algorithm (col.5 ln.36-58)(col.7 ln.12-17).

At the time of the invention it would have been obvious to use the high pass filter of Gao in the invention of Engebretson.

The motivation for doing so would have been to pass signals in the frequency region containing all the unstable feedback frequencies. This would minimize distortion from the adaptive filter as taught by Gao (col.1 ln.52-59).

Gao does not disclose expressly wherein the filter (fig.6 "BPF1") is strictly a highpass filter, however it is known to those of ordinary skill in the art, that a bandpass filter is made up of a cascaded highpass filter with a lowpass filter.

With respect to claim 4, Engebretson discloses a method according to claim 1 in view of Hansen, where the LMS algorithm operates with a predetermined essentially level independent adaptation speed when feedback is not present, this representing a first mode (Hansen: col.8 ln.16-20), where the LMS algorithm operates at a level dependant adaptation speed when feedback is present, this representing a second mode (Hansen: col.7 ln.42-65); where the means for detecting the presence of feedback is used to control the adaptation mode selection of the LMS algorithm (Hansen: col.4 ln.52-67); and where the adaptation speed for the LMS algorithm is determined by a long-term average of a denominator in the LMS update algorithm in the second mode (Hansen: col.7 ln.45-49, col.8 ln.1-20).

With respect to claim 5, Engebretson discloses a method according to claim 4 in view of Hansen and Gao, comprising a microphone (Engebretson: fig.4 #101), a signal path (Engebretson: fig.4 #105), a speaker (Engebretson: fig.3 #17), means for detecting presence of feedback between the speaker and the microphone (Hansen: fig.2 #31) and filter means (Engebretson: fig.4 #113) for at least partly compensating a possible feedback signal, the method comprising: using a bandwidth detection means for determining the presence of a feedback signal. Hansen does not disclose expressly

wherein the feedback detection means (Hansen: fig.2 #31) detects the band width of the feedback signal, however at the time of the invention it would have been obvious to detect the bandwidth of the feedback signals with the bandpass filter of Gao (fig.6 "BPF1"). The motivation for doing so would have been the same as claim 1.

With respect to claim 6, Engebretson discloses a method according to claim 5 in view of Hansen, where the stability of the signal determined as the feedback signal is analyzed (Hansen: col.7 ln.37-44).

With respect to claim 7, Engebretson discloses a method according to claim 6 in view of Hansen, where the feedback analyzing comprises holding flag values from a number of succeeding time frames and comparing of these (Hansen: col.7 ln.11-37).

With respect to claim 8, Engebretson discloses a hearing aid comprising: a microphone (fig.4 #101); a signal path (fig.4 #105); an amplifier (fig.3 #67, col.7 ln.32-33); a speaker (fig.3 #17); filter means for at least partly compensating a possible feedback signal (fig.4 #113); memory means (fig.5 #49) including a LMS algorithm for generating filter coefficients (col.11 ln.60-64); and an additional feedback cancellation filter (fig.4 #109) and a noise generator (fig.4 #115) for providing low-frequency input for the LMS algorithm (col.10 ln.10-17, col.8 ln.38-52).

Engebretson does not disclose expressly means for detecting presence of feedback between the speaker and the microphone.

Hansen discloses means for detecting presence of feedback between the speaker and the microphone (fig.2 #31).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the feedback detection means of Hansen in the invention of Engebretson.

The motivation for doing so would have been to detect changes in the feedback path thus allowing the hearing aid to compensate for these changes by adjusting the speed at which the feedback cancellation filter's coefficients are updated. This would allow the hearing aid to adjust precisely according to environmental changes without inconveniencing the user of the hearing aid as taught by Hansen (col.1 ln.43-55).

Engebretson does not disclose expressly using a highpass filter to prevent low-frequency signals from entering the LMS algorithm.

Gao discloses a method of adaptively canceling acoustic feedback wherein a highpass filter (fig.6 "BPF1") prevents low frequency signals from entering an LMS algorithm (col.5 ln.36-58)(col.7 ln.12-17).

At the time of the invention it would have been obvious to use the high pass filter of Gao in the invention of Engebretson.

The motivation for doing so would have been to pass signals in the frequency region containing all the unstable feedback frequencies. This would minimize distortion from the adaptive filter as taught by Gao (col.1 ln.52-59).

Gao does not disclose expressly wherein the filter (fig.6 "BPF1") is strictly a highpass filter, however it is known to those of ordinary skill in the art, that a bandpass filter is made up of a cascaded highpass filter with a lowpass filter.

With respect to claim 9, Engebretson discloses a hearing aid according to claim 8, further comprising steep low pass filters (fig.3 #59) for generating a low-frequency noise signal to be used as an additional input to the LMS algorithm.

Claims 2 and 3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Engebretson as applied to claim 1 above, and further in view of Borkowski et al (US 4,175,258).

With respect to claim 2 Engebretson discloses a method according to claim 1, however does not disclose expressly where a sign-swapping algorithm is used for generating a broad band noise signal having an amplitude substantially equal to the amplitude of the signal from which it was derived.

Borkowski discloses a method of generating a broad band noise signal having an amplitude substantially equal to the amplitude of the signal from which it was derived where a sign-swapping algorithm (fig.1 #5) is used (col.1 ln.8-14).

At the time of the invention it would have been obvious to a person of ordinary skill in the art to use the broad band noise generator of Borkowski in the invention of Engebretson.

The motivation for using Borkowski's noise generator would have been to provide the system of Engebretson with a stable noise signal that is highly predictable.

With respect to claim 3 Engebretson discloses a method according to claim 2 where a steep low pass filter (fig.3 #59) is used to generate a low frequency noise signal to be used as an additional input to the LMS algorithm.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason R. Kurr whose telephone number is (571) 272-0552. The examiner can normally be reached on M-F 10:00am to 6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vivian Chin can be reached on (571) 273-8300. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JK

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